



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF
THE SPECIAL COMMITTEE OF THE SENATE
ON

LAND USE IN CANADA

No. 2

WEDNESDAY, FEBRUARY 15, 1961
THURSDAY, FEBRUARY 16, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

Mr. A. D. Crerar, Research Planner, Lower Mainland Regional Planning Board.
Dr. P. C. Stobbe, Director, Soil Research Institute; and Dr. P. O. Ripley, Director, (Soils) Research Branch, both of the Canadian Department of Agriculture.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Golding	Molson
Basha	Higgins	Pearson
Bois	Horner	Power
Boucher	Inman	Smith (<i>Kamloops</i>)
Bradette	Leger	Stambaugh
Buchanan	Leonard	Taylor (<i>Norfolk</i>)
Cameron	MacDonald	Taylor (<i>Westmorland</i>)
Crerar	McDonald	Turgeon
Emerson	McGrand	Vaillancourt
Gladstone	Méthot	Wall
		White—31.

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

WEDNESDAY, February 15, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada, met this day at 8:00 p.m.

Present: The Honourable Senators: Pearson, *Chairman*; Basha, Gladstone, Higgins, Inman, McDonald, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), and Turgeon.

In attendance: The Official Reporters of the Senate.

Mr. A. D. Crerar, Research Planner, Lower Mainland Regional Planning Board, British Columbia, presented a brief, was heard and questioned.

The Honourable Senator Taylor (*Westmorland*) informed the Committee that there had been several discrepancies in the original copy of the printed proceedings of the Committee of Thursday, February 2nd, 1961, and that there had been only a limited distribution of the said proceedings and that a revised copy had received general distribution.

At 9:30 p.m. the Committee adjourned until tomorrow, Thursday, February 16th, 1961, at 11:00 a.m.

THURSDAY, February 16th, 1961.

At 11:00 a.m. the Committee resumed.

Present: The Honourable Senators: Pearson, *Chairman*; Barbour, Basha, Boucher, Gladstone, Golding, Higgins, Inman, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*) and Turgeon.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and the Official Reporters of the Senate.

The following Officials from the Canadian Department of Agriculture, presented briefs, were heard and questioned:—

Dr. P. O. Ripley, Director (Soils) Research Branch, and Dr. P. C. Stobbe, Soil Research Institute.

At 12:45 p.m. the Committee adjourned to the call of the Chairman, tentatively set for Thursday, February 23rd, 1961, at 11:00 a.m.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE
SPECIAL COMMITTEE ON LAND USE IN CANADA
EVIDENCE

OTTAWA, Wednesday, February 15, 1961.

The Special Committee on land use in Canada met this day at 8 p.m.

Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: It is 8 o'clock, honourable senators, and I see that we have a quorum. Appearing before our committee tonight is Mr. A. D. Crerar, Research Planner for the Lower Mainland Regional Planning Board. He is from New Westminster, British Columbia. He will be talking on urban sprawl primarily.

We will now hear from Mr. Crerar.

A. D. Crerar, Research Planner, Lower Mainland Regional Planning Board of British Columbia: Mr. Chairman and honourable senators may I give a brief outline of my position and work.

I am research planner with the Lower Mainland Regional Planning Board. The Lower Mainland Regional Planning Board is one established by the Government of the province of British Columbia, having jurisdiction over the whole of the mainland, that is the area from the gulf to Hope. It includes the city of Vancouver and 27 other municipalities. It is provincially established and partially provincially supported but primarily it is a municipal organization. I have been with the Board for ten years and during that time we have studied this matter of land use and in particular the sprawl situation in the lower mainland in great detail.

In 1956 we prepared a report—I was the one in charge of that—on the economic aspects of urban sprawl. We were examining the problem of loose scattered development of the regions from the point of view of just how much it had cost the municipality to have this kind of development, and we came up with certain findings which I will mention in passing over my brief tonight.

Since then we have carried on work in this particular field. A number of items which I introduced into this brief I have been working on for the last two years, where we did a considerable amount of investigation into the land and land market, and another brief which I prepared for "Resources for Tomorrow" which examines the losses of agricultural land in the growth of the major cities in Canada. It is a brief which I prepared for the "Resources for Tomorrow" conference which I again make use of here.

So, in addition to the material which we submitted earlier to your committee, we have carried on our work in this particular line, and I am, as it were, bringing you up to date on some of our more important findings and trying to give you a consolidated brief.

That, Mr. Chairman and honourable senators, will give you an idea of my background and qualifications, as it were.

LAND USE IN THE METROPOLITAN REGIONS OF CANADA

The area of concern of this brief is the metropolitan region. By this I mean the whole of the area physically affected by the growth and development of our great cities. The examination will be considered in three parts:

1. The character and nature of land use in metropolitan regions, with particular emphasis on the frontier between the city and agricultural areas.
2. The reasons for this pattern and some speculation on the future.
3. Suggestions for tackling the problem.

I. Character:

Metropolitan regions can be separated into three broad land use categories, the compact, built-up, urban areas, farm land and the transition area between these two. By my definition the metropolitan region extends outward from the city core to the point where no further loss of farmland occurs.

In other words the metropolitan region is the whole area which is physically affected by the growth of our cities. There are all sorts of things which determine a metropolitan region. You speak of big cities, Vancouver for example, having an influence half way across the Prairies as a grain shipping centre; the distribution of newspapers, which are distributed from cities, often extend the influence of that city out some distance, but what I am speaking of here is the actual physical effects on a city which I would say is recorded by the loss of farm land, and I go into the reason for choosing this particular method of drawing a boundary around a metropolitan region in my brief for the "Resources for Tomorrow" conference. I have reproduced in this brief a map from that, which is map No. 1.

Now, as such, these areas which are influenced by metropolitan development cover huge areas. For example, look at the complex Toronto-Hamilton area, on map No. 1. In other words, I looked at every township out from Toronto and every township out from Hamilton and I found it was a continuous belt of loss of farm land between these two places. Taking the census for 1951 and the census for 1956 we find there was farm land loss all throughout that whole area which is stippled on map No. 1. The Toronto area, for example, covered 1,546,000 acres, in 1956. Now, this brief will not concern itself with land use in the built-up sections of the city or with farm land beyond the zone of influence of the metropolis, but with the uses in the transition zone where the transfer from agricultural to urban use occurs.

The principal use in this area, other than the remaining agricultural lands, is urban sprawl. Urban sprawl is housing, or the subdivision of land for housing, that is urban in character but not compact: that is, developments and subdivisions, unbuilt, partly built or fully built of urban-size lots, scattered at random about the countryside, or straggling along main roads, often widely separated by farms or unused land from the next development, so that while the density of each is urban the overall density of any sizeable area may be as low as one family to every ten acres. (Map 2 illustrates a typical sprawl area in the lower mainland.)

On map No. 2 I have included a typical area of this kind of land use from the lower mainland. It is the municipality of Maple Ridge, but it could be almost any other area. On this map the dark areas represent the areas of urban development where there are people on urban lots, fairly compact houses. All I need to say is that any map of development in these transition areas would show a characteristic of clumps of housing scattered along major roads and stretched out along the various fingers, with little clumps of built-up areas separated by wide expanses of farm land.

That sprawls is extensive there is no doubt. Due to its nature it is difficult to measure precisely, but in the greater Vancouver area it is estimated that it covers 90 square miles, as compared with 80 square miles covered by compact urban development. (See map 3, Metro Area)

On map No. 3 you will see a sketch of the metropolitan area. The dense area, which is centered in Vancouver and New Westminster, with the stringer between, running through Burnaby, should be contrasted with the areas of typical sprawl development in Surrey, Richmond and Delta. That is the strung-out urban, but scattered kind of development that is so typical of this area and so many other areas.

There are many indictments against sprawl, ranging from the aesthetic to the economic. Basically the problem is that those living in sprawl areas are really city dwellers and would like, and in fact need, since their lots are so small, city services such as piped water and sewers. In addition they would like such services as convenient schools, shops and parks, paved roads, sidewalks, covered drains, etc. In other words, they are looking for urban city services. Yet to provide these services even to a minimum standard is often out of the question financially because of the low gross densities of development served.

By this we mean what you can realize, that if you have 100 people along a mile of road frontage, then there are 100 families to share the cost of building that road; and if there are 10 people along a mile of road frontage, there are only 10 families to share the cost of building that mile of road. It is just as simple as that. An illustration of this particular point is shown on map No. 4. It is a part of North Delta, in the suburban area of Vancouver. It shows a photograph of about one square mile of this part of North Delta, 640 acres, and it contains 223 houses, three schools, a small shopping centre, a few small stores, one park site, undeveloped, a church, and a number of small holdings; and the remaining agricultural land. In that area there are about seven miles of road; and about half the total area is unused. What does it cost the taxpayer? Here is part of the bill: laying sewers, \$220,000; laying water mains, \$89,000; paving streets, \$44,000; for a total of \$353,000.

Senator HIGGINS: Who would pay for the streets?

Mr. CRERAR: Normally it is the municipality's responsibility. The cost per house is \$1,660. In an area developed at urban density, the cost per house would be \$400. In other words, if you increased the density you would cut down on the cost to each person.

Studies by the Lower Mainland Regional Planning Board in a number of municipalities have shown that inevitably sprawl areas have been unable to pay the costs of the municipal services that they require. That was the result of this report on the economic aspects of urban sprawl, which you have previously had. They are inevitably deficit areas. Compact urban areas, under certain circumstances, can do so. Farm areas inevitably pay far more in taxes than they receive in services when they are in a municipality that is affected by sprawl development. Those were the essential findings of this study on the economic aspects of urban sprawl, Lower Mainland Regional Planning Board, 1956.

In addition to these unsatisfactory aspects is the sheer waste of land that accompanies this kind of development. Land is wasted by development being strung along road frontages, sterilizing the back acreage, and by being scattered in and about farmland breaking up potential economic units. In addition there is the unseen and probably even more significant waste associated with land speculation in advance of actual development. In one suburban municipality in Greater Vancouver between November, 1953

and November, 1958, 14,554 urban lots were created to accommodate 4,775 new homes, or over 3 new lots for each new house. At the end of a period of rapid growth a supply of vacant lots equivalent to 13½ years' demand existed; land was removed from production in 1959 that would not be needed till 1972.

Not only is land removed from production long before it is needed, it is often sterilized well in advance of either urban development or subdivision. Around San Jose, California, it was found that deterioration of orchards was closely related to anticipations of urban demand. (*Determination of Land Use in Rural Urban Transition Areas*, Dr. Lessinger, Berkeley, California, 1956).

He found there was a definite correlation between people, as it were, just abandoning their farms and their expectations of where urban development would occur. General observation indicates that this is a common phenomena, with the anticipation of urban development leading to "land mining" well in advance of actual city development. "Land mining" is when you start taking everything out of your land and do not put anything back because you think that in five or ten years, or in some short time in the future, you are going to be subdividing it down and getting rid of it, in any event.

When these factors are consolidated we find that the growth of Canada's metropolitan regions between 1951 and 1956 caused an average loss of 382 acres of farmland for each 1,000 population increase. (See *The Loss of Farmland in the Growth of the Metropolitan Regions of Canada*, a brief to the Resources for Tomorrow Conference by A. D. Crerar). This was the major result of my examination for the resources for tomorrow conference. I took all the major cities in Canada—Ottawa, Quebec City, Montreal, Vancouver, Winnipeg, London, Toronto, Hamilton and Windsor. I found, with the exception of Ottawa and Quebec City, that in the three big centres—Winnipeg, Toronto-Hamilton, and Montreal—the loss of farm land was around this 382 acres per thousand population increase. In Winnipeg it was 381; in Toronto-Hamilton, 382; and in Montreal, 374. In my view, there seems to be the same kind of process operating in all these places, taking out about 382 acres of farm land for each thousand people added.

I am not in a position to judge the consequences to the national agricultural picture of losses of land of this order. It is sufficient to say that the Gordon Commission envisages an increase of 8,800,000 people in Canada's metropolitan regions by 1980, which at the rates established between 1951 and 1956 could mean the loss of 3,360,000 acres of farmland, or an area equivalent to the whole of the farmland in Prince Edward Island and Nova Scotia. It nevertheless represents only about 2 per cent of Canada's farmland in 1956. I might say that is the best or some of the best 2 per cent that we have. It is land in the lower Fraser Valley; in the Toronto-Hamilton-St. Catharines' area; land around the city of Montreal; and if you name the fairly good agricultural areas, then that is where we are going to lose it.

What does seem to be important is that about two-thirds of this loss can only be described as waste by any conceivable standard. It is the waste of land that raises costs and municipal taxes, that blights the countryside and makes the provision of even minimal standards of city services either expensive or impossible.

That is the end of my first part. And now I come to:

II. Causes

It is only within the last thirty years that we could develop our cities in this way. The obvious basic necessities are universal motor car ownership and the accompanying road system. These permit growth to penetrate anywhere within 50 miles of the centre of town.

Changes in corporate attitude have removed most natural controls on scattered growth. Thirty years ago utility companies, both public and private, had a whole series of charges which the scattered and distant dweller had to pay, extra charges for the extension of pole lines, service charges, frontage taxes or the simple refusal to provide the service. The charges were based on the fact that the provision of services to scattered population is uneconomic, and the general belief that no one segment of the population deserved a subsidy, the philosophy that you should only get what you pay for. Today, of course, such an attitude would be unthinkable and utilities are encouraged at every level to equalize charges throughout their area of service and to extend their services with only minimal regard to the additional costs. It is deliberate, though perhaps not conscious, policy to make every segment of the metropolitan region as much like every other as possible in terms of the cost of public utilities.

Families are now free to locate anywhere, since they have cars, and do not pay an extra economic charge for living at low densities. There are also the positive attractions of "country living", fresh air and space, and the contrasting dirt and congestion of the central city, to lure people outwards. We really do not know, as yet, how much the positive attractions mean in terms of enticing people out and how satisfied they are when they get there. The Lower Mainland Regional Planning Board is at present conducting a survey to obtain these specific facts. It would seem, from casual observation, that the attempt is to build a new "suburb" by setting down 10 or 50 or more houses on city lots in the fields out from the central city. It would seem that what is wanted is an extension to the city and that people are locating here because they can not find housing at prices they can afford within the built up sections of the city.

The most obvious explanation of why this new addition to the city is built so far out is that there is no vacant land left within, or close to, the city. This is a common impression, but on examination it is found to be completely erroneous. *House and Home*—which I might mention here is a house building magazine which is put out by the *Time* organization for the home builders and building contractors in North America, and which is not to be confused with *Home and Gardens*—has examined conditions around eleven major American cities and found that there are millions of acres of by-passed land closer to town than most of today's new tracts—more millions of acres of by-passed land than the housing industry will need for many, many years. The United States Census of Governments reported in 1957 that there were 13 million vacant lots of record in the United States, about 13 times the annual consumption in new constructions.

In every Canadian city that I have examined the situation is the same, vast supplies of by-passed land, of subdivided but vacant land exist. But in spite of this plenty, prices for vacant lots continue to advance. In the same suburban municipality mentioned earlier, where between November 1953 and November 1958 14,544 new lots were created to permit the construction of 4775 new homes, the price of lots advanced from approximately \$950 each to between \$1200 and \$1500 from 1954 and 1959.

Two major explanations can be given for this anomaly of price advances in the face of massive oversupply. The first is simply ignorance. Few know what the state of the land market at any time really is. How can they? No record is kept of the number of vacant lots available, or of the number added in any period. In every other industry the state of the inventory is known weekly or monthly, plans are made and prices adjusted on the basis of this knowledge. But for any city in Canada it is impossible to tell how many vacant lots there are, or how many new lots were added to the stock in the last month, the last year or the last decade.

The second general explanation for rising prices in the face of an over supply of land is the psychology and reaction of the land market. Each succeeding seller holds out for a higher price than his predecessor and prices advance in an exponential fashion in relation to development. Unfortunately no details of the workings of this phenomena in the residential land market can be given. However, a very detailed examination of the industrial land market has been made in the course of my Board's studies and it is assumed that residential land prices would react in the same way, though on a quite different scale. The graph shows the relationship between percent of land developed and median assessed land value. (See graph IV). To translate this into more meaningful terms the table below shows the development history of a 100 acre parcel on line with the material plotted.

<i>Number of Acres Occupied</i>	<i>Median Value (\$ per acre)</i>
10	\$ 2,300
20	2,800
30	3,500
40	4,600
50	6,400
60	9,400
70	16,000
80	31,000
90	90,000

This graph has been tested statistically with the material we got from our industrial land survey, and we found the statistical correlation to be excellent, and it seems to be a true picture of at least the way the industrial land market reacts. From what we know of the residential land market I think this would be the way that it would react. The scale would be different. It would never reach as high a figure as for industrial land. The point is that it takes only very little development to bring about a very, very large increase in price, and I think most people know this and react in this way to this knowledge.

The result is that only a small amount of development is necessary to increase the price substantially. What happens in practice is that the buyer is forced out to areas that have experienced little or no development to obtain land at the price he can afford to pay. It is this leapfrogging outwards and the bypassing of the logical land for development that is the root cause of urban sprawl.

However, even this frantic outward search has not brought lower land costs. In the Vancouver area 55% of the increase in the cost of building a single family NHA home between 1951 and 1958 was due to the increase in land prices. During this period the cost of building a standard house went up by 11.2% while the cost of the average NHA lot went up by 132%.

Senator HIGGINS: What is an NHA lot?

Mr. CRERAR: It is a lot on which loans under the National Housing Act are granted, and in 1958 the average NHA lot cost 132 per cent more than it did in 1951.

There is no need to labour the importance of high land costs at a time when Canada's building industry is stagnating in spite of the unsatisfied demand for housing among the lower third of our income groups.

There is one other point. Planners across Canada have identified urban sprawl and have remedies for tackling it. Municipal councils in every section of the country have the power to adopt measures to control it. But the will to tackle the problem is paralyzed. Politically it is difficult to draw a line and

say "thus far and no farther", thereby depriving one group of a possible speculative gain and, if the line is drawn tightly enough, to increase land prices on the urban side of the line. The enormous pressures building up in the UK to disintegrate the green belts shows the lengths to which this can go. They did, in fact, draw the line and try to hold it very strictly in the United Kingdom, and now this endeavour to contain development within a limited area is having a reaction in the prices that they have to pay for land.

III. *Solutions:*

Must we then contemplate a future of continuing land butchery and land waste; of sky-rocketing municipal taxes and land prices?

If nothing were to be done the answer is certainly yes, and in addition the end result would be another "land bust" such as has marked the end of every speculative cycle that we have experienced up to now. There have been a number of them. Every period of advance in agriculture and development has, I think, experienced a land bust. This is quite evident.

There are remedies available at every level of government but I will concentrate here on those which naturally fall to the Federal Government.

1. Information: As was pointed out, much of what has occurred is due to sheer ignorance and misinformation.

- (a) Records on potential building acreage, the number of vacant lots, the services that they have and the price for which they sell should be collected on a national basis. A month by month record by census tract and municipality should be made. This information is readily available in municipal records, assessment rolls or Land Registry offices right now. All that is required is that it be collected on a systematic basis and be disseminated regularly. It would be no more difficult than keeping track of the number of eggs in storage, the amount of timber sawn or the number of building permits issued.
- (b) The program of land use studies in the metropolitan regions by the Geographic Branch of the Department of Mines and Technical Surveys should be accelerated. This is the best record of what is happening to the land about our major cities and will provide a firm foundation for any future studies of city growth.
- (c) Further study of land use and land cost is essential. Such studies can only be meaningful when the whole area of the metropolitan region is examined. The material included here on industrial land cost in relation to development was only found because the Board examined the whole of the area influenced by industrial development without regard to municipal boundaries. A similar examination is necessary for residential land and again it can not be restricted to anything less than the whole area affected by residential development, that is the metropolitan region. The Lower Mainland Regional Planning Board hopes to carry out such a study this year, if time and funds permit. But such studies should not be the by-product of individual Boards in isolated instances, they should be the continuing concern of a body which could investigate the problems of any urban area in Canada. Such a body should have the same relationship to our cities that agricultural experimental stations have to farming.

2. In cities where land prices have got out of hand direct action might be necessary. This would involve the acquisition by a government agency of supplies of building land which would then be released to the open market at a price below the going rates. It would involve a deliberate attempt to break the market for residential land.

Central Mortgage and Housing Corporation has the power to do this at the present time, either in conjunction with provinces and municipalities or by itself. Such a course was suggested at the convention of the National Home Builders in Montreal last month. In reply Mr. Bates, the president of CMHC, was quoted in the *Toronto Telegraph* as saying "You would have to acquire land for an area of five or six miles around each urban centre to make it work. It would mean nationalization." Mr. Bates would be perfectly right if a real land shortage existed, such as is the case in the UK. But I would insist that no such shortage exists here and that only a relatively small alternative supply at a reasonable price, or perhaps even the announced determination to undertake such a course, would be sufficient to bring land prices down. Neither Mr. Bates nor myself, however, is in a position to prove his contention, since the facts with which to do so do not exist, that is, information on the supply and price of building lots.

The reason I say that even the announced determination to undertake such a course would be sufficient to bring land prices down is that I recall a case where they decided to build a pulp mill in the municipality of North Cowichan. There were certain people who wished to make speculative gains on the new development it would bring. Reeve Murchison, a very vigorous person, announced that if he found the price of land and lots increasing too much the municipality would subdivide some of the land it held and place it on the market at a price which the workers in this pulp mill could afford. The announcement of this intention, and the fact that Mr. Murchison was a very vigorous and determined person, was sufficient to hold down prices in that particular municipality. That is the reason I can say this announced determination would be sufficient.

3. A re-examination of public utility policies is necessary. For the last 30 years every extension of rural electrification, of natural gas supplies or telephone free calling service has been greeted as an unmitigated blessing. Certainly there is much to be said for it; rural electrification, for example, is completely justified in enabling the farmer to be a more productive member of society; whatever subsidy he has received has been amply repaid. However, can the same be said for areas of urban sprawl? Is the subsidy required from the city dweller justified when it enables straggly knots of residential housing to locate anywhere within 50 miles of the city centre at no extra cost for the extra burden?

Other remedies are available to the provinces, such as exempting farmers within agricultural zones from the burden of municipal taxes. Such relief should only be provided when farmers are prevented from subdividing their land and receiving the possible benefit of urban prices.

The shift of municipal taxation within urban areas from improvements to land would also be of great assistance in combating sprawl.

However, all the previous suggestions would probably be of little help if they were not accompanied by an increase in the score and acceptance of city and regional planning. The measures suggested would enable better planning to be done, they can not replace planning. There are at present only four cities in Canada which can hope to completely control urban sprawl because there are only four cities in Canada that have planning boards whose jurisdiction covers the whole of the metropolitan region, the whole area within which the problem occurs. Of these cities, two—Calgary and Edmonton—also have the problem of land prices well in hand due to municipal land ownership. Winnipeg's new metro planning area covers the whole zone of urban influence and they will probably be able to tackle the problem satisfactorily. The fourth area is the Lower Mainland of British Columbia. The Lower Mainland Regional Planning Board has been operating in an advisory capacity; it can identify problems but do little about them, except by persuading individual

municipalities to adopt policies that are good for them and the region too. No other cities in Canada, including Metro Toronto, are capable of tackling the problem of urban sprawl with complete success, since they have no jurisdiction over the whole of the affected area. Until they do, sprawl cannot be truly checked.

The CHAIRMAN: Thank you, sir. There is a lot of substance in your brief. Are there any questions?

Senator SMITH (*Kamloops*): Mr. Chairman, is it not a fact that one of the key factors in this whole thing is control or lack of control of the speculative development? I say that, because you mentioned the number of lots that are still left vacant in marginal areas between the core of the urban centre and the sprawl developments. Now, is that not because large areas of that later development which is close to the core of the urban centre has gone into the control on a wholesale basis and the individual is driven out to areas further away to get away from that largely controlled area?

Mr. CRERAR: No, I do not think this is due to speculators, because almost everyone is a speculator who is thinking of subdividing this land up. It is just a natural factor, it would seem to us from our studies, that as an area builds up that happens. If you take 100 acres and build up 30 acres, the price just goes up, and goes up in a regular fashion, as we have shown on the graph. In fact, we can give you a formula for that, which we have put on the graph. Where the price goes up in relation to the amount of development that there is, what happens is that a person dealing in real estate knows that this is the way land prices react. Development of a certain amount brings a great increase in price. In other words, you add 10 per cent more development, and instead of your price increasing by 10 per cent your price instead may increase anywhere from 50 per cent to 120 per cent. The point is that prices increase much more rapidly than development does, and it is not so much due to people speculating, but because they know this kind of relationship—more development brings higher prices.

The CHAIRMAN: Do you mean the ordinary person buying a lot is a speculator, or do you mean the builder?

Mr. CRERAR: Well, it is largely the person who has acquired land and is releasing it on the market, or holds it—sits with it. The longer he sits, the more development goes on, the better off he is going to be, actually. If he sold at the beginning of the development he would only get a relatively small price. If he can hold for ten years, and does not need the money at that time immediately, by that time the area is 50 per cent developed. We can just look at this particular graph again. Suppose he sold when the area was only 10 per cent developed, he would have got a price of \$2,300. If he had held it until it was 50 per cent developed, he would have got \$6,400. In other words, he would almost have tripled, or just about tripled his value if he had held it. If he had been able to hold on a little longer, and held it until it was 70 per cent—supposing he had the last 30 acres in a 100 acre block and brought it on the market himself at that time, and the area was 70 per cent developed he would get something like \$16,000. In other words, if he had been able to hold from the time it was 50 per cent developed until it was 70 per cent developed, he would have again, well, almost tripled; but the figures get bigger, the rise keeps on going in that fashion.

Senator STAMBAUGH: Of course, the amount of taxes would have a great deal to do with it; and if the development was slow he might as well have a quick profit and turnover.

Mr. CRERAR: The more rapid development takes place the more temptation to hold on to land for the speculative increase—the rise in value; and of course instead of 25 years, so that the more rapid our cities grow the more temptation

to hold on to land for the speculative increase the rise in value; and of course the less taxes are on land the more incentive there is to hold on to the land for the speculative rise.

Senator STAMBAUGH: In your brief, you say:

"It would seem that what is wanted is an extension to the city and that people are locating here because they cannot find housing at prices they can afford within the built-up sections of the city."

Now, in my experience that very often is not the case, and people sell houses in the city cheaper, and build several miles out at nearly twice the cost.

Mr. CRERAR: Well, the reason I say this is because the kind of housing that I am discussing here, that is going up out there is often city housing; it is a city lot of 60 by 120, to build just on the outskirts of the city if he could find what he wanted, but does not particularly want to move out too far, preferring rather to move out about half a mile.

Senator STAMBAUGH: I think you would find in a great many cases, that many of the houses on sale inside the city would be substantial brick houses of two storeys, but they want split level houses a little further out which are not nearly so substantial. I am only speaking from my experience.

Mr. CRERAR: Well, we really don't know. As I have said, we are going to conduct a study this year to find out just what people are looking for when they move out of these areas, and we hope to be able to give statistics which will show that 25 per cent do this, and 30 per cent move out to these areas for this reason. We don't really know right now, and we are merely making a guess, I must say.

Senator HIGGINS: You show in Map 4 a square mile area containing 223 houses, and that the cost of laying sewers and water mains and paving streets amounts to a total of \$353,000, and the cost per house is \$1,660; also that in an area developed at urban density, the cost per house would be about \$400. Supposing other people came along afterwards and built in the same area and took advantage of all the improvements, what would they be charged, the same amount of money proportionately?

Mr. CRERAR: Well, it depends largely on when they came in, because, as you know, with taxes and all that kind of thing, it goes on for a 20-year period.

Senator HIGGINS: Would the people who own the 223 houses be paid back any of that?

Mr. CRERAR: No. It would reduce to each person the cost of—

Senator HIGGINS: The first 223 people pay the full amount?

Mr. CRERAR: Well, yes, they would. They would have to pay the full amount.

Senator HIGGINS: In other words, the municipality would pay those costs, and the other people would get the advantages when they came in?

Mr. CRERAR: Yes. Of course, the thing is that this area was peculiar in that it did get sewers, water mains and streets. What normally happens, in our areas at least, is that they don't get streets. They do get water. Normally, that is what occurs in these areas. We get watermains, gravel roads, open ditches, septic tanks—that is the extent of the services.

Senator HIGGINS: What number of taxpayers could ask for these improvements? Could a minority be forced to join in?

Mr. CRERAR: Yes. A money bylaw is put before the voters and if two-thirds of the land holders approve, that is two-thirds of the assessed value must approve such a bylaw, then the other one-third must come in.

The CHAIRMAN: Is there any law preventing a farmer holding on to his land and then selling it later on in this urban sprawl?

Mr. CRERAR: If you would look at map No. 3, I can show you what the situation is in the lower mainland. In map No. 3 you will see a stippled area called "Agricultural Zoning, 5 acre minimum". You will see Surrey, Richmond, Delta, Pitt Meadows—the stippled area shows an area which is called an agricultural zone. The minimum area to which land in this zone can be subdivided within these zones is 5 acres. This is designed to prevent urban sprawl from occurring. Of course the thing is that the sprawl development is so great now in lower mainland, particularly in Surrey and Richmond, that all that is being done by this 5-acre limit is to prevent a few scattered developments from locating within the agricultural areas. The hook-up of these zones forms a continuous green belt around the greater Vancouver metropolitan area and Pitt Meadows, Surrey, Delta, and Richmond zones in effect form a green belt around the urban development and the large metropolitan area. This has been achieved by each one of these municipalities individually passing zoning bylaws with this 5-acre minimum feature because they wanted to encourage dense development in certain areas, and they could then bring services to those areas and build them up, all of which would not cost the taxpayers too much, and then gradually extend outwards with the services. Although we did use persuasion to convince them this was a good thing, actually each of these municipalities passed their own bylaws.

The CHAIRMAN: It was not done at the behest of the province?

Mr. CRERAR: No, nor by any super force—it was done by each of these municipalities individually. We had urged this on them of course and in most of these cases these bylaws were passed following our recommendations, but they adopted them individually.

Senator TAYLOR (*Westmorland*): How long did it take them to get into the frame of mind where they would be willing to do that?

Mr. CRERAR: We had to work, I think, seven years to get our first convert, which was Surrey. That was about 1957, or 1956. The rest of them have come within the last four years—that is the other four municipalities.

Senator TURGEON: There has been a great deal of development done in that vicinity by a group of persons who are bent on bringing in industrial development. This group was from the United Kingdom if I remember rightly. Did their plans have any large effect on bringing on this sprawling municipal development you speak of? Or did that come all by itself?

Mr. CRERAR: I would take it that you are speaking about the development of Annacis Sound. This is an island which is connected to New Westminster rather than to the other side of the river. I do not think the industrial development that occurred in that area has much to do with the municipal development which has occurred. I happen to know this area well. I could give you maps of this area, but I could also give you maps of any area in Canada, except Calgary and Edmonton, and probably Winnipeg, where the same kind of conditions prevail. I could probably refer you to a map of Ottawa and show you that the same kind of thing occurred here.

Senator SMITH (*Kamloops*): Is there any lesson to be learned from the development of these new cities like Canberra, and the capital city of Brazil, Brasilia? Are those developed on a leasehold basis, or is the land held on a freehold basis?

Mr. CRERAR: I do not really know exactly what system they use there. I would imagine a capital like Brasilia would probably be operated on a leasehold basis.

Senator SMITH (*Kamloops*): That is the way Washington is, is it not?

Mr. CRERAR: I really do not know, Senator Smith. I could not answer that question. I do not feel that it would be too practical to operate on that kind of basis here, inasmuch as we are a freehold country, as it were.

Senator SMITH (*Kamloops*): It was just a matter of information. I wondered what they did in those places because I understand that it is not freehold in Washington, and that is tied to the fact that they have no franchise there.

Mr. CRERAR: I could not give you any information on that.

The CHAIRMAN: Referring to map No. 3, I see a line showing the new Trans-Canada highway running southeast from Fraser Mills to Abbotsford. Now, look at the line of the existing highway, which runs through Langley. Along this highway we see little spots of urban development here and there. Can you tell us if they anticipate anything in the way of stopping that same type of development along the new highway?

Mr. CRERAR: No.

The CHAIRMAN: They can go ahead?

Mr. CRERAR: Yes. This is our problem at the present moment. Our Board is very disturbed by this. There is another limit on there which I have not mentioned so far. It says "one-half hour travelling time from new bridge at Port Mann." I would say that this line is the extent to where development can spread. Previously it extended through this rather straggly development we see around Surrey. That was pretty well the limit where people could locate and get back into the city to work each day. I think when the new Trans-Canada highway is completed they will be able to go out to this other line which represents a half-hour travelling time from the Port Mann bridge. That brings a whole new threat of another stage of sprawl development which might lead to breaking this green belt which we have so laboriously constructed here, in a way.

The CHAIRMAN: With regard to the construction of these new super highways, should there not be some regulation over construction or development along those highways? You build the highways for speed, to ease people in and out of cities; and then you allow filling stations, motels and little stores to build up, which necessarily slow down speeds, because of the danger in those areas?

Mr. CRERAR: This is very true.

The CHAIRMAN: That is a very serious problem, is it not?

Mr. CRERAR: Yes. The new Trans-Canada Highway, itself, is limited access.

Senator SMITH (*Kamloops*): That is a freeway, is it not?

Mr. CRERAR: Yes. There are only access points every two or 2½ miles, so that the highway itself will not, as it were, be built up with this ribbon of commercial development—the hotdog stands, filling stations, and so on, all strung out, which the old Trans-Canada Highway, in every part of Canada, I suppose, has experienced. What will happen, of course, is that the new development will take place just at these cloverleaves and will spread back from one cloverleaf towards another. It will just mean the same kind of thing will occur. It will not be strung out along the highway, but will take place on the secondary roads, off the cloverleaf, and then you will run into the hotdog stands and so forth. Of course, it will increase the traffic on the highways further out and probably will necessitate additional or new lanes at some future date.

Senator SMITH (*Kamloops*): Is there any thought to combat that type of development at all now?

Mr. CRERAR: We hope to this year. We now have legislation which enables us to prepare a regional plan for the greater Vancouver lower mainland area.

We hope to prepare a regional plan this year, because we have been working for 10 years now on this, and we have accumulated a mass of information. We are in a position probably to prepare this plan for the Vancouver area. Then, if the plan is adopted by two-thirds of the member municipalities in the lower mainland—that is, approximately 19 municipalities agree to the plan—then it will be binding on all of them. So, this is our hope, that we will be able to get the plan completed this year, and that it will be accepted by two-thirds of the member municipalities. Then it will become a binding regional development plan.

Senator TAYLOR (*Westmorland*): What about these limited access roads on to the Trans-Canada Highway? Is there any way of preventing this type of development there? You say there is a limited access road coming in every two or 2½ miles; and that going back on the Trans-Canada Highway 100 yards, or 200 or 300 feet, you are building a secondary road and that area is becoming built up, and you get a mile on one side and a mile on the other side, so that you are going to have a continuous band of development. There is nothing to prevent that, is there?

Mr. CRERAR: No.

Senator HIGGINS: Senator Smith, you were referring to the distinction between freehold land and leasehold land.

Senator SMITH (*Kamloops*): I am not trying to promote anything, and I have no idea about the leasehold; but I just wondered how that works out in these new developments, where they are putting in these big, planned cities.

Senator HIGGINS: The reason for the long lease is that the person who gets the land pays really a freehold price and it is leased to him for 99 years for a peppercorn rent, so that in the lease you put certain covenants the landlord can assess on, and they run in a leasehold but not in freehold. That is the way they do it in Newfoundland, so that you have control over all the houses and prevent people doing certain things.

Mr. CRERAR: This is quite a useful device.

Senator HIGGINS: They are 99 or 999-year leases.

Mr. CRERAR: Under the present legislation, the municipalities in British Columbia are prevented from leasing for more than seven years.

Senator HIGGINS: But you would not build a house for a lease of seven years.

Mr. CRERAR: No, but with this kind of provision it means that no municipality ever enters into a lease because there would be no one willing to take up a lease from a municipality if it was only for seven years, which is the maximum they can give. We and the various planning organizations have suggested leasing on a long-term basis should be open to municipalities as well as everybody else.

Senator HIGGINS: I do not say it should be, but they can do that, and it would be very profitable because then they would have control. They would be able to say, "You cannot build anything else on this land," "You can only do certain things," or, "You cannot build a shop there."

Mr. CRERAR: This would be a very useful device, but it is one which is not empowered at present in British Columbia.

Senator SMITH (*Kamloops*): Why restrict it to seven years?

Mr. CRERAR: I am not sure, and I have no idea as to what the intention behind that was; I just do not know. I know that is the situation at the present time; and we, the planners' organizations in British Columbia, have asked this to be extended so that the municipalities can lease for a 20-year period.

Senator INMAN: Ninety-nine-year leases create an awful lot of trouble sometimes. I know of cases where they have.

Mr. CRERAR: Yes. I am not too familiar with the advantages and disadvantages of lease-holding myself. It is practically unknown, in my experience.

The CHAIRMAN: In your development, in your municipality, you have a small area which pays. I think that is in map No. 4. Does not all of the frontage property pay the taxes?

Mr. CRERAR: That is right.

The CHAIRMAN: All that property pays the taxes?

Mr. CRERAR: That is correct.

The CHAIRMAN: Irrespective of the fact there are only 223 houses in that area, every foot is assessed so much for water and so much for sewers?

Mr. CRERAR: If it is done on the street frontage basis this would be true; everybody would pay in proportion to the frontage they have. But there are two fees, a flat fee, normally, and a frontage fee in addition. So the flat fee is what each house pays. Then people with an extensive frontage will pay some additional part of the cost.

The CHAIRMAN: You have to have a flat fee to start with, so as to cover your debenture?

Mr. CRERAR: Yes. This will vary the conditions on the flat fee, as to how much you pay. If the flat fee covers 80 per cent of the cost, then actually the cost is being borne mainly by each household. If the frontage tax bears 80 per cent of the cost, then most of the cost is being borne by the landholder who has frontage on the street. Normally, they split it so that the houses pay most of the cost, and the frontage owners only pay a relatively small share.

Senator SMITH (*Kamloops*): Just before we conclude, Mr. Crerar, you mentioned a different situation existing in Edmonton and Calgary. Years ago did they have what they call a single tax which discouraged the holding of vacant land, which added a penalty to the owner of vacant land, who bore a greater share of the tax load than the improved property holder? Had that anything to do with the situation in Edmonton and Calgary?

Mr. CRERAR: Well, if they had had a single tax—which I am not sure about because I do not know the situation there—it would certainly have been of assistance to them. All I know about the Edmonton and Calgary situation is that they have extremely good planning boards or commissions, and also that they have considerable areas of municipal land which they release at reasonable rates to enable homes to be built. They have control on the one hand, and on the other hand they can release the land and have it developed in an orderly fashion with all of the services installed before moving on to another area, in which they will again extend the whole area outward. Incidentally, Edmonton and Calgary are the fastest growing cities in Canada.

Senator STAMBAUGH: I can give some information with respect to that single tax. It is true that for many years they had a single tax, but what happened was that in every little depression the taxes were so high on vacant lots that they went back to the city. When the time came for Edmonton and Calgary to have some control they held about two-thirds of the vacant land inside the city limits. They had thousands of lots which were already serviced by sewers and water, so they had a good start.

Senator HIGGINS: I am sure, honourable senators, that we all thank Mr. Crerar very much.

The CHAIRMAN: Yes, Mr. Crerar, thank you very much for coming here tonight.

Senator TAYLOR (*Westmorland*): Mr. Chairman and honourable senators, may I make a brief explanation of why it was necessary to have a revised printing of the Proceedings before the committee of February 2, last.

On that occasion the committee did me the honour of appointing me Acting Chairman for the day, and in that capacity I acted.

On page 17 of the proceedings, while speaking of the necessity for completion of the soil survey of the country, I am reported to have said:

It will be one of the first recommendations from the Land Use Committee to the Government.

That of course should read:

That was the first recommendation from the Land Use Committee to the Government.

Further, throughout the body of the report the name "Mr. Kortright", President of the Conservation Council of Ontario, the organization which was making representations before the committee, was mistakenly used for "Mr. Henderson", the Executive Director of that organization, who presented the brief and testified before the committee.

A limited number of copies of the first printing of the proceedings were distributed, and at least one misleading newspaper article was brought to my attention. Copies of a revised printing of the corrected proceedings have now been received and distributed.

Honourable senators, I offer this explanation so that the matter may be clear to all.

The committee adjourned.

Ottawa, Thursday, February 16, 1961.

The Special Committee on Land Use in Canada met this day at 11 a.m.

Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: Honourable senators, we have a quorum, and since we shall probably have a busy morning I think it would be as well to start right away. Dr. Ripley is here to present his brief. Then shall we have questions after your brief has been read, Dr. Ripley, or shall we wait until Dr. Stobbe is finished?

Dr. RIPLEY: I think probably it would be as well to have questions after my brief has been read, because Dr. Stobbe's is slightly different.

The CHAIRMAN: Thank you. Dr. Stobbe will speak on "Land Use in Relation to Soil Adaptability."

Dr. P. O. Ripley, Director of Soils, Department of Agriculture: Mr. Chairman and senators, I have outlined in the brief the subject of soil erosion in Canada. This matter of soil erosion is a factor in soil land use and soil conservation which has interested people right down through the centuries. The history of soil erosion in China, for instance, is very old and very drastic. The United States' soil conservation people have featured soil erosion, and in fact soil erosion control in the mind of many people is soil conservation, and a number of people feel that it is the only factor. We think it is much broader than that,

of course, but erosion is one of the factors with which we have to contend, and I have tried to present in this brief something of the importance of it in Canada.

Due to the climatic and farming conditions in Canada soil erosion has not been as important as it has appeared to be in the United States and some other countries. In 1950 our soil survey people prepared a map for the food and agriculture organization, and we were asked to present in some way the extent of erosion as we saw it in Canada. The approach that the soil surveyors made in this connection was that they divided it into what they called slight or practically no erosion, moderate erosion, and severe erosion. The slight or non-erosion was where the productivity of the land had been reduced by less than 10 per cent. The moderate erosion was where it had been eroded and the productivity reduced a matter of 10 to 35 per cent. Severe erosion was that erosion which lowered the productivity in the area, in the estimate of the soil surveyors, more than 35 per cent. The map was drawn, and the coloured area represents the area of improved land, really, and as I pointed out the last time I was here, one of the things I would like to stress is the rather small amount of improved farm land that there is in Canada. Only 6 per cent of the total land area is improved farm land. Now, as you see, this map shows a yellow area where there is little or no erosion taking place, and it represents in Eastern Canada about 70 per cent of the improved farm land having slightly or no erosion. The blue coloured area is the moderate erosion, and it represents in Eastern Canada about 26 per cent of the total improved land area. Under severe erosion—and you can hardly see it—there are just little spots of red indicated; it is very localized and hard to show on a map of this kind; but in Eastern Canada it represents about a million acres. The soil surveyors figure it is 4 per cent of the total land area.

The figures for Western Canada have just been obtained, and the estimate in 1950 in Western Canada is—and this includes both wind erosion and soil erosion and water erosion—that the extent of slight or non-erosion was 76 per cent, and of moderate and severe erosion, 22 per cent. I do not know whether this figure means very much or not, but we will try to estimate in some way what the erosion was. We compared this, though, with some of the estimates of erosion in the United States. In the New England states and in the mid-Atlantic states, and east north central states, that is, an area very similar to our area in Eastern Canada, the conditions are very similar, and you may expect probably that the situation would be about the same, and it is. As I have stated in the third paragraph of the brief, it was estimated that in the New England, middle Atlantic and east-north-central regions of the United States, where conditions are similar to Eastern Canada, 71.8 per cent suffered from slight erosion; 25.4 per cent from moderate erosion, as compared with 26 per cent in Eastern Canada; severe erosion was 2.8 per cent in these north-eastern states, compared with our 4 per cent in Eastern Canada.

Erosion is much higher in the east-south-central states, which include Louisiana, Arkansas, Tennessee, Kentucky and Missouri. The annual precipitation in this area ranges from 30 inches to 80 inches, and there is very little frost during any part of the year, hence the soil is open for erosion all year round. They are not in the deep freeze like we are in parts of Canada for five or six months in the year, and erosion is a potential there all the time. That is indicated by the amount of erosion; the slight or non-erosion is 18.1 per cent, the moderate erosion, 51.9 per cent, and the severe erosion, 30 per cent.

In order to get some idea of what erosion will do, we ran an experiment in Ottawa a few years ago. As a matter of fact this experiment was handled by Mr. Dixon, who is with us this morning. He brought out a little publication a few years ago, from which I got the figures. We simulated erosion. This was not actually eroded land, we simply removed certain amounts of top soil,

three inches in one case, and about six or seven inches in another case. We grew barley and alfalfa on these soils, and the barley yield over a 10-year period, with no fertilizer, where the soil was undisturbed, was 27.8 bushels per acre. When we removed three inches of the surface soil this yield was reduced to 22.1 bushels per acre, a reduction of 5.1 bushels.

Senator TAYLOR (*Westmorland*): Did you say that where there was no soil removed it was 27.8 bushels per acre or where the seven inches of soil had been removed?

Dr. RIPLEY: On the undisturbed soil, with no soil removed. It is not a high yield, this 27.8 bushels, but it does give the relative difference. Where three inches of the top soil was removed it was reduced to 22 bushels, and where we took the whole of the surface soil off, seven inches, we only received 3.8 bushels of barley, practically a crop failure.

Senator STAMBAUGH: How long had this land that you were using in the experiment been cropped before? It was not new land?

Dr. RIPLEY: No, this was in the middle of our experimental farm. It was in Grenville sandy loam.

Senator STAMBAUGH: That would make a difference in the low yield, if it had been cropped for many years. The value of the soil is gone.

Dr. RIPLEY: Well, as yields go, I expect the average yield for the province of Ontario in barley is 25 bushels. It is not as low as all that. We were able to increase the yield to 42 bushels by adding a bit of fertilizer to this particular soil, so that it was not all that bad. We grew alfalfa then, after the barley, and alfalfa is a crop that will grow fairly well on subsoil. Where the soil was undisturbed we had a yield of 3 tons per acre; where all the soil was removed we had a yield of 1.8 tons, almost 2 tons. So the alfalfa will do very well on this subsoil because it needs the minerals that in this subsoil. I just slipped this in to give you an idea of what can happen when surface soil is eroded off. The surface of the soil of course contains the main plant nutrients, and if you remove that there is no question about it reducing crop yields.

Senator STAMBAUGH: It would be interesting to know what happens if you grew grain on there after the alfalfa crop had been in for a few years.

Dr. RIPLEY: We did that. It does help. The alfalfa in addition to growing on the subsoils does improve the soil texture. It is a legume crop and capable of taking nitrogen from the air, but it does improve the soil. This 10-year average of barley crop was obtained after an alfalfa crop. In a 10-year period you do not bring back an eroded soil to normal production by any cropping methods. It can be done but it takes a longer period than that. It is true that the alfalfa, in addition to growing well on this subsoil improves the subsoil itself. It is one of the best crops you can grow to protect soil from erosion. Any grass or legume crop is good protection.

Senator BARBOUR: This soil must have been very deep in the first instance or you would not have been able to grow as much as you did.

Dr. RIPLEY: It has been farmed for a couple of hundred years and has been subject to normal rotation, and some fertilizer has been applied of course. It is not a particularly rundown soil, it has been farmed normally.

Senator TAYLOR (*Westmorland*): Would that be a heavy clay subsoil?

Dr. RIPLEY: No, the Grenville soil is a limey soil, fairly deep down.

Dr. STOBBE: It is a limey soil and has lots of lime in the subsoil.

Senator BARBOUR: I suppose that is the reason they never had to use any lime on it.

Dr. RIPLEY: Yes.

Now, I will move along: Most of the erosion in eastern Canada is caused by water, as I point out here, and I thought it might be interesting just to pick out a few local areas where erosion has occurred. It occurs of course all over the country but we have had quite a considerable amount of erosion in the central hilly part of Prince Edward Island. Some of you will be familiar with that area. One of the bad areas in Nova Scotia is in the Annapolis Valley—it is hilly, and, again, fairly heavy rainstorms occur occasionally. There was one rainstorm in 1942 which deposited 7.9 inches of rain in four days, and there was terrific flooding and erosion in that one particular rainfall. In Cumberland county, in Nova Scotia, around Nappan, the erosion is rather bad too, because it is quite hilly. In New Brunswick most erosion occurs in the Saint John River Valley. Here a lot of potatoes are grown. Of course that is a row crop and not all planted on contour, so there is a considerable loss there. A few years ago some people took samples of silt out of the Saint John River for several months and determined the amount of silt that was in the Saint John River and they estimated that in one year 1.5 million tons of soil is flooded away in the Saint John River.

In Quebec erosion could be very serious in the eastern townships in southern Quebec, but fortunately they keep it in grass quite a lot. That is the crop that is grown mostly—hay and pasture. In June, 1943, 9.31 inches of rain was received in one rainfall, 4 inches in one 24-hour period. I used to live in Lennoxville on a farm there, and at Lennoxville and Sherbrooke four or five rivers converge and these flooded their banks and millions of dollars of damage was done by deposition of silt from these rivers on good farm land all around that region.

In Ontario of course we all know about the National River close to Ottawa, flooding and washing away soil; the Etobicoke and the Humber River in the Toronto area, the Ganaraska River around Cobourg, and the Thames River and their flooding. Flood and erosion seem to go together. In Manitoba we all remember the 1950 flood when the Red River and the Assiniboine River overflowed and flooded the city of Winnipeg.

There is a considerable amount of water erosion in the Turtle Mountain area in Manitoba and in the Riding Mountain up further north, near Dauphin.

In Saskatchewan water erosion is very excessive, especially in the Cyprus Hills and Wood Mountain area and also up further north in the St. Louis and Hagen areas, around Melfort and in that area.

In Alberta the Peace River area is one of the notable erosion areas where considerable erosion takes place.

In British Columbia, up around Smithers, in the northern part, there is quite a bit of erosion, and then of course in the Fraser River Valley, particularly in the delta of the Fraser there is a great deal of it.

Senator HIGGINS: Would you point out the location of the Fraser River Valley.

Dr. RIPLEY: It empties right near Vancouver, and flows from the north right back almost as far as Prince George.

Wind erosion is not as serious in eastern Canada. We have a little in New Brunswick, Ontario and Quebec but it is not extensive except on the very sandy soils, and in some cases on the mucky soils where vegetable crops are grown fairly extensively. There is a considerable amount of water erosion in the Prairies. Those of you who know the Prairies will recall the dust storms of the thirties in the Melita and Boissevain areas, in Manitoba, and there were also some in the Dauphin area. There has been wind erosion in Saskatchewan around Regina, Biggar, St. Louis, Watrous and Swift Current,

and there has been some around Lethbridge and Calgary in Alberta. Wind erosion is also found in the Peace River area of Alberta. There is very little, if any, in British Columbia.

This covers some of the erosion as it takes place in Canada. It is still difficult for the soil surveyors to estimate what damage occurs. We know there is erosion but just to give it a dollars and cents value is almost impossible due to our farming conditions, particularly in eastern Canada where erosion is not as bad as it is in some other countries, particularly the southern United States.

Farming and land use conditions change over a long period of years and under improved conditions erosion can be halted and land which has been eroded can be improved and brought back into relatively good production. This has probably taken place to a considerable extent, especially in eastern Canada. There are 672 million acres of total land area in eastern Canada and of this, 429 million acres or 64 per cent is forested. Forests give fairly good protection to soil from the standpoint of erosion, and this in itself is good land use, provided the forests are managed properly.

I have tried to divide the crops grown in eastern Canada into what I call the "Erosion Prevention Crops", the "Intermediate Crops for Erosion Control", and a third group I call the "Poor Erosion Control Crops." There are 42,684,142 acres of farm land in eastern Canada. Of this area 28 per cent is in farm woodlots; 9 per cent in wild pasture; 16 per cent in improved pasture and 18 per cent in tame hay. These are all erosion prevention crops and make up 71 per cent of farmland area in eastern Canada.

Of the crops which are in the intermediate for erosion control group I have put tree fruits which make up .3 per cent, small fruits .1 per cent, wheat .2 per cent, oats .6 per cent, barley .3 per cent, rye .02 per cent, mixed grain .3 per cent and flax .04 per cent, a total of 1.86 per cent.

In the poor erosion control group we have listed corn for grain 1 per cent, corn for silage .9 per cent, potatoes .6 per cent, soybeans .6 per cent, tobacco .3 per cent, vegetables .4 per cent, buckwheat .2 per cent, summerfallow 1 per cent, field beans .1 per cent, root crops .1 per cent, and other fodder crops 1 per cent. This is a total of only 6.2 per cent of the area in eastern Canada.

So you can see that there is a more or less natural measure of control in eastern Canada because of the cropping systems used. I should mention that this does not quite total 100 per cent, if you happen to add these up, and this is because of the fact we have not included a few crops such as sugar beets and small-acreage crops, and we have not included farm buildings, lanes, and so on.

Senator TAYLOR (*Westmorland*): Why did you put buckwheat in the second group rather than with grains?

Dr. RIPLEY: Buckwheat is a short season crop, for one thing, and usually the land is exposed during quite a bit of the growing season so that it is vulnerable to erosion. Buckwheat does not give quite as good a cover as some of the other grain crops. I can see where there might be some doubt in your mind.

The CHAIRMAN: It is a short-stem crop?

Dr. RIPLEY: Not altogether a short-stem crop but it is not a leafy crop; that is to say, it is a rather stemmy crop. It has a broad leaf but in my opinion—and I may be wrong—it does not give the same cover as a crop of oats would.

Senator TAYLOR (*Westmorland*): The buckwheat we grow in New Brunswick is, for the most part, the Japanese variety and it is very bushy and leafy. You only sow about two-thirds of a bushel to the acre and it grows up like a tree and the leaves on it give good protection.

Dr. RIPLEY: It does while it is there but we plant buckwheat about the end of June and harvest it at the end of August. It does not cover the ground for as long a period of time as does oats, which are seeded a month or more earlier.

Senator TAYLOR (*Westmorland*): But it is generally seeded down the same as grain, oats and barley. You usually sow grain and grass seed with it.

Dr. RIPLEY: I believe that in Ontario they hardly ever seed down with buckwheat, although I know they do in the Maritimes. It does not amount to very much anyway. It is just .2 per cent of the total land area in eastern Canada. When we get to Western Canada, however, we find the situation is quite different. The total farm land in the three Prairie provinces is 126,696,191 acres. Of this acreage the fairly good soil erosion control crops show wild pasture occupying 24 per cent of the land, woodland 5 per cent, improved pastures 2 per cent, tame hay 2 per cent, and other fodder crops .5 per cent, a total of 33.5 per cent. That compares with the total of 71 per cent for these crops in eastern Canada.

Crops intermediate for erosion control occupy a total of 33.51 per cent. Wheat occupies 18 per cent of the land, oats 7 per cent, barley 6 per cent, rye .3 per cent, mixed grain .2 per cent and vegetable crops .01 per cent and flax 2.0 per cent.

Under the groups of poor crops for erosion control are listed corn for silage .2 per cent, potatoes .04 per cent, rape .3 per cent, buckwheat .05 per cent and summerfallow 19 per cent, a total of 19.41 per cent.

A much greater proportion of the intermediate and poor erosion control crops are used in the Prairie provinces, and these crops make the potential for erosion considerably greater, and summerfallow during the whole year and grain crop areas during the part of the year are exposed particularly to wind erosion damage. There is considerable water erosion too in various areas.

I have mentioned this not to indicate that I think we have water or wind erosion under perfect control, but our systems of farming in Canada generally, particularly in eastern Canada where we have so much grass and good cover crop, are such that the erosion problem is not as serious as it is in countries where cotton and corn are grown in large areas such as in the United States.

In western Canada where a large area of 22 million acres of summer-fallow gives us a problem, erosion control practices are being set up. Trash cover, strip cropping and cloddy structure of the soil and other measures are being used to control soil drifting. If the farmers would only use these methods, we think we could pretty well control the erosion. They do not use these methods, however, and I expect we will have a constant serious problem of erosion because it is difficult to get everybody to follow the practices which will control it.

Gentlemen, I hope this has given you a picture of the erosion situation and how it is being handled in Canada. If there are any questions I would be glad to try to answer them.

Senator STAMBAUGH: With regard to the statement that farmers are not using these methods, I think that generally speaking in western Canada they are using methods of trash cover and cloddy structure.

Dr. RIPLEY: Many of them are, yes.

Senator STAMBAUGH: It is so much different than it was 30 years ago. When you drive through the countryside you get the impression that a different method of farming is being used.

Dr. RIPLEY: That is true.

Senator STAMBAUGH: I believe the percentage that do not use some measure of erosion control is pretty small.

Dr. RIPLEY: I think that is right. There are very few using a plow, for instance, but not so many have got into strip cropping.

Senator STAMBAUGH: They have a wind problem in the southern part of Alberta and they are practising strip cropping there.

Senator TAYLOR (*Westmorland*): I would like to refer to some of the work that has been done in the St. John river valley, as far as erosion is concerned. At one time I had something to do with the administration of agricultural policies there, and I have seen probably more than one acre of top soil completely gone after a heavy rainfall that came down some of those side hills. I can recall storms that took away all the potato seed and top soil down the river. That has also happened in the region of the Tobique river, in what we call the New Denmark centre. It became very serious, because the area was down into the sub-soil, as in Truro. I have seen it when it has been just like sugar and has dissolved and run away. A number of years ago we started in with a farm management plan and laid out the farms in contours, with various drainage systems, and so on. I recall being in the Grand Falls area at one time, and one fairly large farmer said that after one year of contour planning he would not take \$5,000 for the plans that had been laid out on his farm. That gives some idea of the work that was done. Whether it has been continued, I do not know. In that potato belt, potatoes are planted in the soil for two or three years in a row, and the fibre has gone out of the soil. They simply had to do something about it, and now they are plating on the contours, and so on. This has been a very serious problem, and probably still is.

Dr. RIPLEY: Yes, it is still a problem, and they are still working on it. In other provinces they are doing similar work. The Ontario people have done quite a considerable amount of work in planning farms; the same in New Brunswick. Saskatchewan has a soil conservation unit in the provincial government; and they are doing quite a bit of work around St. Louis and Hagen—there is quite a development there. I should like to see more of it, but I think we can be very well satisfied that with the information available on erosion control, both wind and water erosion, gradually farmers are taking it up.

Senator TAYLOR (*Westmorland*): I think farmers in those areas are pretty conscious of the fact that something has to be done.

Dr. RIPLEY: Yes.

Senator HIGGINS: I presume that erosion has not yet become a very serious problem in Canada, from what you have stated in your brief.

Dr. RIPLEY: As I say in the third paragraph of the brief, "In the opinion of most of the soil surveyors it is serious but not alarming." I do not know if that is a good statement or not.

Senator HIGGINS: I believe it has become a very great problem in the United States, has it not?

Dr. RIPLEY: In the New England states, and states where they have mixed farming, and there is a lot of grass, the situation is about the same as in Eastern Canada.

Senator HIGGINS: I am referring particularly to the Missouri valleys. Many years ago they started to grow Chinese elms there. What is the position now, have those elms grown?

Dr. RIPLEY: I do not think I can answer that because I have never been in that area, and I suppose I have not kept up with my reading.

Senator HIGGINS: Terrific dust storms came from there and went as far as Boston and New York. That has never happened on the prairies when there have been dust storms, has it?

Dr. RIPLEY: Well, it travels fairly far. In the thirties the dust from storms travelled quite a distance.

Senator STAMBAUGH: It used to go from Lethbridge to Winnipeg, anyway.

Dr. RIPLEY: Yes, and further south too. It not only affected that area between Winnipeg and Lethbridge, but went north, though not too far. In Northern Canada, I suppose 200 miles from the border drifting is not bad. However, it is bad in Montana, and in the north-central states it just about shuts out the sun, and you would think it was almost night time.

Senator STAMBAUGH: I was thinking of what happened in Canada. It was even worse when you got down south of the border in Dakota and parts of Montana, and most of Minnesota.

The CHAIRMAN: Do you find any difference in soil erosion due to the different types of soil?

Dr. RIPLEY: Yes, quite a difference. As far as water erosion is concerned, clay soils—sometimes we refer to them as heavy soils—water does not permeate them or soak into the soil, but it will run off the surface. The heavy clay soils are the ones that erode badly. Of course, water runs into sandy soils and does not run over them. The opposite is true of wind erosion. It is the fine sandy soils mostly that are affected by winds. The cloddy structure of clay holds it so that it does not drift as much.

Mr. STUTT: With regard to water erosion, is silt one of the biggest features?

Dr. RIPLEY: Yes, silt and clay affect the water erosion, of course.

Mr. STUTT: The two together?

Dr. RIPLEY: Yes. They make a very packed soil and the water just cannot get into it, and if water starts running over the surface, then of course that is where erosion starts.

Mr. STUTT: One can pretty well pinpoint erosion by silt and clay?

Dr. STOBBE: That is a question of soil type in land use.

Dr. RIPLEY: If you have a clay soil that is covered over it is pretty well protected. Right along, if you can keep a cover on of forest or grass, a cover of any kind, it is going to protect any kind of soil, really, but there is a difference between soil types and their erosion potential.

Senator STAMBAUGH: Along with the type of soil is the question of the amount of rainfall?

Dr. RIPLEY: With water erosion it is not a question of the total amount of rain. You can get 30 or 40 inches of rainfall or precipitation during the year and may not have any erosion at all. In June 1949, in Ottawa, where we were able to measure run-off, we had one rainfall of three inches in about an hour, I think it was, and in that one hour it took off 66 tons of soil per acre. It is heavy, intense rains that really cause the damage and give you the erosion, mainly. If that three inches had fallen even over a 24-hour period, we would not have had nearly as much, although we would have had some. However, it is these very heavy, intense rains that cause most of the erosion.

Senator HIGGINS: You mentioned that there is no wind erosion in Newfoundland. Is there enough farming to cause any erosion at all?

Dr. RIPLEY: There is not very much. I think less than one per cent of the total land area in Newfoundland is farmland.

Senator HIGGINS: It is very hilly country, and even water erosion is nil. I was fishing in a river on the west coast once, and a very heavy rainfall ran down through the valley; it rose about six feet and there was no erosion at all.

Dr. RIPLEY: No; our soil survey did not record any erosion at all. The whole agricultural land was listed under non-erosion or slight erosion, which means practically no erosion.

Senator HIGGINS: Are they allowed to cut down trees from the banks of rivers at the mainland?

Dr. RIPLEY: You are getting into forestry now. I do not know what is allowed and what is not allowed, but there are some regulations. I am not sure enough to answer that.

Senator HIGGINS: Very few of our rivers in Newfoundland have trees on their banks.

Dr. RIPLEY: I think that is right.

Senator HIGGINS: Which shows that the most important thing is to have trees around.

Dr. RIPLEY: Well, it is a big help.

Senator TAYLOR (*Westmorland*): It may be interesting to the committee to know that while I was in Scotland a few years ago as a delegate along with the Canadian Federation, at which time I attended the I.F.A.P. in Sweden, I met a farmer in Scotland near Ayrshire. His farm was known as the "Rotten Row" farm; and we were out in a pasture that was on a fairly steep slope of a hill. I told him that I presumed that the first consideration in that part of the country was good cattle, good livestock, for successful farming, to which he replied, "No, our first consideration is soil. We underdrain all our soil." I said, "You don't mean to say this field here is underdrained?"; to which he replied in the affirmative. I asked him why. He replied that it was underdrained in order to hold the water as it comes, and that by underdraining the soil down to three feet it becomes a sort of sponge that holds the water, otherwise the rain comes and all runs off and they don't get the benefit of it. I have not heard of that done in Canada to the same degree. I do not think we take the same interest in our soils that they do in the Old Country.

Dr. RIPLEY: I think that is pretty true of Canadian farming generally. We have not had to take care. In all the European countries, their farms are not as large as ours, but their yields are much higher, partly due to good management, partly due to better climatic conditions, of course; but our farmers have not been pressed to really get right down and do a good job of farming.

Senator SMITH (*Kamloops*): Dr. Ripley, you mentioned the percentage of farm land that the country has as a whole. What is it?

Dr. RIPLEY: It is about 6 per cent, I think, of the occupied farm land—it is 6 per cent of the total land area of the whole country.

Senator SMITH (*Kamloops*): What percentage of the land in Newfoundland is capable of being used?

The CHAIRMAN: Senator Smith, this is covered pretty well in the next brief we are going to hear. You will be able to discuss that point with our next witness. Is that agreeable?

Senator SMITH (*Kamloops*): That is fine.

Dr. RIPLEY: We are working on the production of an erosion bulletin, which I hope very shortly will be available.

The CHAIRMAN: Honourable senators, I would like to say in passing that Dr. Ripley has a new title. He is now Director of Soils. When he appeared before us in 1958 he was Chief of the Field Husbandry Division.

We will now hear from Dr. Stobbe.

P. C. Stobbe, Director of The Soil Usage Institute, Ottawa, Ontario:

Mr. Chairman and honourable senators, at the present time I am Director of the Soil Usage Institute. However, my remarks will be based on my association and my experience with the Canadian Soil Service over a period of 25 to 30 years. During that time I have had opportunities to visit and to examine soil in almost every county in eastern Canada and perhaps to a less extent in western Canada but I have been on various study trips in western Canada so I am familiar to a certain extent with the soils there. A great deal of what I have to say today probably has already been told to this committee. In view of my background and my training and my special attention to my study of different kinds of soils perhaps my approach to what I have come to say and what has been said to you before might be a little different.

First of all, I would like to say that the soil service organizations across Canada—ad I am using the word “organizations”—are engaged in a co-operative program in which we have federal and provincial units working together, and thus we have a number of organizations all co-ordinated through Ottawa.

The CHAIRMAN: It covers all of Canada?

Dr. STOBBE: Yes. We are not as active at the present time in some provinces as in others. For instance, in Newfoundland we have been most unfortunate that for the last two or three years we have not been able to find men to direct the work there. But otherwise we are active and our organization covers all of Canada.

To date the Canadian soil survey organizations have covered about 250 million acres of land, and that has meant different types of soil surveys. Some of them are done in detail, some of them are reconnaissances, and some are on a rather broad basis. Now, these 250 million acres include about 85 per cent to 90 per cent of our improved farm land in Canada. According to the census figures we have about 100 million acres of improved farm land, of which we have covered about 85 per cent to 90 per cent, and that means that there are still about 10 million acres of improved farm land which have not been covered to date by any kind of survey. It also means that we have covered considerable acreages of land that is not improved farm land, woodlots or in many cases not occupied by farms at all. This generally was done in settled areas but we have also covered some woodlots that are not settled at all at the present time, in order to get an estimate of our soil potential.

Now, if we look at our figures of improved farm land—I said it was about 100 million acres, we find that our acreage of improved farm land has been increased, between 1951 and 1956, by about 3 million acres, so we are still on the upswing.

However, if we look at the individual figures, by provinces, we find that in eastern Canada there has been a considerable decrease in the acreage of improved farm land: In the Maritimes, for instance, this decrease, since 1911, has been 36 per cent of the improved farm land. In Quebec the decrease has been about .04 million acres and in Ontario, 1.1 million acres since that same date. This decrease has taken place even though there has been considerable development of new land in Quebec and in Ontario. One might ask why does this situation exist, why this decrease? Well, if we look at our soil survey maps we find that almost invariably the lands which have been returned to forest, which have been abandoned, are low quality lands, land that produced some

crops and some food at a time 50 to 100 years ago when people were clearing the land and were getting revenue from forest products. However, as our society and our economic conditions changed, the produce from this land could not compete on the market with produce from better land and consequently there was no alternative in many cases but for people to leave the land.

Now, it is true that in many cases there are other factors, social and economic factors, such as roads, schools, distance from markets, all have an important bearing on this situation.

From the soil survey information obtained to date, one may estimate that at least 5 per cent of our improved farm land is just as poor in its productive capacity as the land that has already been abandoned. A lot of land use of this land at the present time is undergoing a change, and we can be almost certain that sooner or later these lands also will be abandoned.

Now, it seems to me that instead of encouraging people to stay on poor land of that nature one should encourage and perhaps assist them to leave such land. In many instances such land is left to reforest itself or to reg rass itself under natural conditions. This is very often a slow and costly procedure and I think that in many instances this could be expedited, if some facilities or some organization or some provisions were made that would assist people to reforest or reg rass such land.

About 10 per cent of our improved agricultural land, our occupied agricultural land, consists of excellent agricultural soils. These soils have a good natural fertility, they hold moderate amounts of moisture, they have a good topography and are well drained. They are not subject to erosion and are free of stone. In other words, under reasonably good management these soils will produce good yields of the crops adapted to the climatic conditions. In general, these are the soils against which all other soils have to compete on the market. That is a very important point, for many people do not realize that there is this question of competition of produce from different soils.

We think that 5 per cent of the soil should be reforested, and we say that 10 per cent consists of excellent agricultural soils. This means that 85 per cent of the soils represent a great range in productivity levels and a wide variety of problems in land use. This 85 per cent includes some of our better soils that could be considered as first-class land if devoted to specific land use, that is, to a specific crop to which they are adapted or best suited.

For example, I might refer to some of our tobacco soils which could be considered as first-class land if devoted to the production of flue-cured tobacco. However, if they are not used for flue-cured tobacco they are poor-producing lands due to low fertility, organic substance, erosion, and so on. So the question arises as to how this land that is not suitable for tobacco should be used. There have been instances where the land has been reforested and it is excellent for growing pine. Should a farmer continue to farm this land on an unproductive basis with the hope that some day he might possibly grow tobacco on it, or should he reforest it?

We know that at the present time, certainly,—and perhaps for a long time to come,—we are not able to grow tobacco on all the soils best suited for that crop. So that is a very important question when we discuss land use. Soil is suited for certain things and not so well suited for others. It may be suited for reforestation and someone has to decide locally on the spot what is the best use to make of this land. At the present time a large percentage of it is just a problem to us.

A somewhat similar situation but to a less degree is that of the orchard soils in Quebec. Many of the gravelly soils in this area may be considered as first-class soils if used for apple orchards but if used for ordinary farm crops, such as hay and grain, they may only be rated as mediocre soils.

A somewhat similar situation exists in the Niagara Peninsula, where some of the better soils used for stone fruit such as peaches and cherries fall in about the same category. They are certainly first-class lands. In this case, however, the situation differs greatly from the tobacco soils. The extent or supply of our good peach and cherry soils is very limited. Due to their location and due to the fact that these soils also make good building sites, a substantial acreage of these limited first-class soils is annually converted into industrial sites and suburban developments, thus bringing about a very marked change in land use. In other words, every year we are losing considerable acreage of this first-quality fruit land, of which we have a very limited acreage, to rural and industrial development. So there again this range in land use from fruit land to industrial sites and housing developments is very significant when we come to discuss land use and what should be done about it.

Most of our soils are better suited—and this is particularly true in eastern Canada—to one crop than to others. That particular crop may be potatoes, hay, alfalfa, timothy, grain, or corn. We find that the most effective use can be made of the land if it is grown to the crop to which it is best suited.

Over the years many farmers have learned this by themselves and in general, I might say, the land is probably used to its best advantage according to suitability. However, this is not always so and only too often we find that better use could be made of land by growing better adapted crops. When I say this I fully appreciate that due to availability of markets and farm management requirements, it is not always feasible to use land for those crops to which it is most suited. You might have too much of one produce on the market and therefore have to use the soil for other purposes, but on the whole, readjustments in land use could be made to increase efficiency.

Many of the better soils in the 85 per cent group could be considerably improved and turned into first-class land by the installation and application of certain management practices. For instance, some of our imperfect land could be turned into first-class lands by the installation of fairly simple drainage improvements, by controlling erosion hazards, by removal of stone, by liming and by fertilization. Some of our average and good agricultural soils could be converted to first-class soils, and their efficiency of production improved, if these methods were followed. However, the productivity of many of the poorer soils—those in the 85 per cent group—can be raised to the level of the better soils only by intensive and often costly management practices, and even with such practices it is often difficult to raise production beyond average levels.

A great deal can be done by improving the fertility of soils. I would like to cite some examples from our fertility investigations here in Carleton County. With the application of commercial fertilizers in farmers' fields we found that we could increase the yield of silage corn on one of the poorer soils from 3.7 tons per acre to 17 tons with the best fertilizer treatment that we applied. In the case of one of our better soils the increase was from 20 tons without fertilizers to 30 tons with fertilizers. Even with the best treatment the poor soil did not yield as much as the better soil without commercial fertilizers. This tremendous increase of 13 tons per acre on the poor soil cost \$54 per acre or, on the average, \$4 per ton of silage corn. It is obvious that at present prices no one can afford to grow silage corn at \$4 per ton, for fertilizers alone, but it is also obvious that no one can afford to grow corn with yields of 3.7 tons per acre. If one is going to grow corn at all on this soil it would have to be at considerably less than maximum yield. It would have to be at a lower level of productivity. Perhaps around 9 to 10 tons per acre, and at a considerably reduced price per ton. On the other hand, this poor land when used for grass, produced $\frac{3}{4}$ of a ton per acre. With fertilizers we could increase it by more than a ton. If we

increased it to that amount, again the cost was too high. In order to produce this crop most efficiently we would have to apply fertilizer to it and produce less than its maximum productivity level. Using less fertilizer produced less yield at more cost per unit. So when we take this soil, one could produce grass and feed the livestock more efficiently than if one used corn. On the other hand, one might question if one could afford to farm that soil at all. Certainly, you could not afford to grow corn with fertilizer. Grass, even if you raised your yield from $\frac{3}{4}$ to $1\frac{1}{2}$ tons, would still cost about \$4.00 per ton for hay and fertilizer, and it is a question. We have a great deal of this soil in Eastern Ontario and Quebec. Many farmers have reverted some of this land to forest. A large number of them are still cultivating this type of land. I would say that roughly 200,000 acres would still be under cultivation. But here is a question which is not so easily decided, in the circumstances, whether one should recommend this particular soil for reforestation or for other land use—agriculture. That would have to depend on the set up and the local conditions within the community, and on the individual farmer.

I will now turn to the subject of drainage. We have in this part of Ontario and Quebec a poorly drained soil which at the present time is producing poor crops of low quality hay and pasture. Occasionally it is planted to oats or buckwheat, and very often we find only half the field planted and the seed drill stuck in the mud for the rest of the summer. It is obvious that this soil as a good deal of it is farmed is not productive. On the other hand, we have found this same type of soil can be improved, and has been improved. We have some of the same soil on the Experimental Farm, and this is one of the most productive soils we have. Over a period of 30 years it has produced an average yield of $3\frac{3}{4}$ tons of good quality hay per acre under a moderate fertility programme. So here you have a case of soil that might be considered as marginal or sub-marginal turned into the highest producing soil that we have.

I might also say at this time that it is not so easy to drain some of this land, due to drainage outlet, and due to the fact that on this kind of land there is a tendency for the tiles to silt in, and precautions have to be taken. However, in a case of this kind we now have again to decide, are we going to improve this particular land, and it can be improved, at a cost, or should it be taken out of agriculture. It is obvious to me over the long run that no one can make a living and exist on this type of land as it has been used in a large percentage of the cases.

Now, there are other cases where the land is just as poorly drained which is producing about the same as the other poor pasture, where we know that improved drainage alone will not improve the productivity of that soil. Other factors, such as liming, organic matter, a great deal of fertilizer, sometimes removal of stones, all have to be implemented in order to raise the productivity of that soil; and here it is quite obvious with land like that, at least under present conditions, and any conditions that will prevail for sometime to come, it should not be farmed.

We have all the gradations in between these two extremes of soils as far as drainage is concerned. So far as fertility is concerned, we have the same conditions, so I am quoting this just to give you an example that the kind of land that you have must play an important part on what use you make of the soil.

I would like to mention some other conditions where the productive capacity of the soil is changing greatly by tremendous changes and immense efforts we are applying to the soil. In this relation, I would like to mention some of our organic soils. We have a great acreage of organic soils in Canada; a lot of it is waste land, some of it is farmed in an effective manner, some of

it has been considerably improved and farmed well, and some of it is used for industrial purposes. We know that a considerable percentage of this land can be tremendously improved by controlled drainage, and by that I mean drainage and irrigation cultural practices, by liming and fertilizers. By these means some of this cheap and very poor land can be returned to the best and most expensive land that we have. A great deal of this land, I know, is selling from \$1,000 to \$2,000 an acre, and it is worth it as far as producing land is concerned. So here you have a situation where you can change the use of the lands entirely, depending on what you do to them. In most cases, this development is too expensive and too big a job for individual farmers, but it has been done quite successfully by private capital, and they are producing crops on it and competing successfully. In time this development might force changes in agricultural use of some of the other land. Some of the same situation applies to irrigation, where we apply the irrigation to many of our poorer producing soils, thereby changing the productive capacity of that soil, and in many instances changing the soil itself. It stands to reason that we must also change the land use of such soil with such development.

There is another factor which has a great bearing on land use, and which I believe I should mention, and that is the size of the farm. It applies particularly to many of those where at the present time we have problems in land use. We have many farms with soils that in the past have produced good crops, with good management, and at the present time are still productive, if they are managed; but unfortunately many of these farms are not being farmed, or in some cases only partially, and in some cases are only serving as residences for a family that is working elsewhere. At the same time, some of these soils are still quite productive if used properly. In many cases we find either that the unit is too small to give sufficient return to people to stay on the land, or that it is the lay-out of the fields, which is determined by the kind of soil you have. Also, perhaps the soils themselves do not lend themselves to modern farming practices, but are all right where you use a team of horses and where the farmer competes with others who use similar methods, but at the present time the nature of the land and its lay-out is such that it does not lend itself to modern practices. That would suggest that one, two, or a number of these farms must eventually be combined to form a unit that is large enough to operate with modern practices, which might require a number of changes in land use. It might require that some of the poorer soils on these farms could be taken into forests. In that way the crops could be consolidated on the better pieces of land and perhaps other areas might be turned into grass and pasture. In many instances this change in land use can only be put into operation efficiently by increasing the size of the farm.

At present adjustments are going on in our land use and particularly of the type of land included in the lower part of this 85 per cent figure. It is advisable that these adjustments should go on and it seems to me that we should do everything possible to expedite and assist and guide this re-adjustment because it is bound to come. Some of the conditions that have influenced the use of the land that I have discussed might have to be applied.

I would like to say that any changes in the use of the land that we are proposing or suggesting must keep in mind the kind of soil, the kind of land, what the land is suitable for, what can be done with it. In the long run I believe what is best for the land is also best for the people. Very often our land use might be affected too much in an attempt to help the people for the time being rather than to think of the long range view of having the land help the people.

I do not know of a single operation or practice that we could apply to all our soils across Canada. It seems to me that the land and the problems

associated with it have to be studied regionally, they will have to be studied locally, on the individual farm. The solutions to these problems have to be worked out jointly, according to what the problems are, and as I said before I think we should have some provisions whereby we could expedite this thing, whereby we could assist people to get off the land, assist people to settle on the land. It might require financial assistance, and also, no question about it, it will require technical guidance.

Senator McGRAND: Is corn not rather expensive as far as soil usage goes?

Dr. STOBBE: Not necessarily.

Senator McGRAND: Does not the growing of corn involve evaporation and a lowering of water level of the soil?

Dr. STOBBE: No, I do not think so. Corn certainly would not lower a water level so much as alfalfa will.

Senator McGRAND: I read this in a book on conservation,—it said that America gave two curses to the world, and one of them is corn.

Dr. STOBBE: Well, one of the big contributions that America has made has been the production of good corn.

Senator BARBOUR: You say that there 36% of improved land in the Maritimes has gone out of production.

Dr. STOBBE: That is the figure given in the census.

Senator BARBOUR: Isn't there much more produced on the remaining land than there was produced ten years ago?

Dr. STOBBE: I wish that were proved. I have that point covered in the brief. In our estimation we could in eastern Canada double our production if we used the land the way it should be used, and on less land than we are farming now. So actually this poorer land, the land that should be out of production, and some of this submarginal land, contributes very little to the total production. So I would say that there is still enough land that we could improve.

Senator BARBOUR: It is the poor land that is not producing much.

Dr. STOBBE: Yes.

Senator HIGGINS: I might say that I know nothing about farming. I see crops growing and I hear about them. In your brief you did not mention much about the rotation of crops. Are you referring to that when in your brief you say, "These changes are generally most effective when they are accompanied by changes in land use"?

Dr. STOBBE: Yes, rotation of crops is part of our management of soils and of land. We think certain types of rotation are necessary for good soil management, yet you might have other types of farming where rotation does not enter into it so much. If a farmer is carrying on grass farming the only rotation needed there is whenever your grass runs out to get it seeded down usually with a grain crop. In other cases it is very difficult to establish rotation because we do not have too many alternatives in what we can rotate. In some of our best land, for instance, the alternatives are limited. Our farmers have been finding over the years that there is not too much rotation—summerfallow is one method by which you can conserve your moisture.

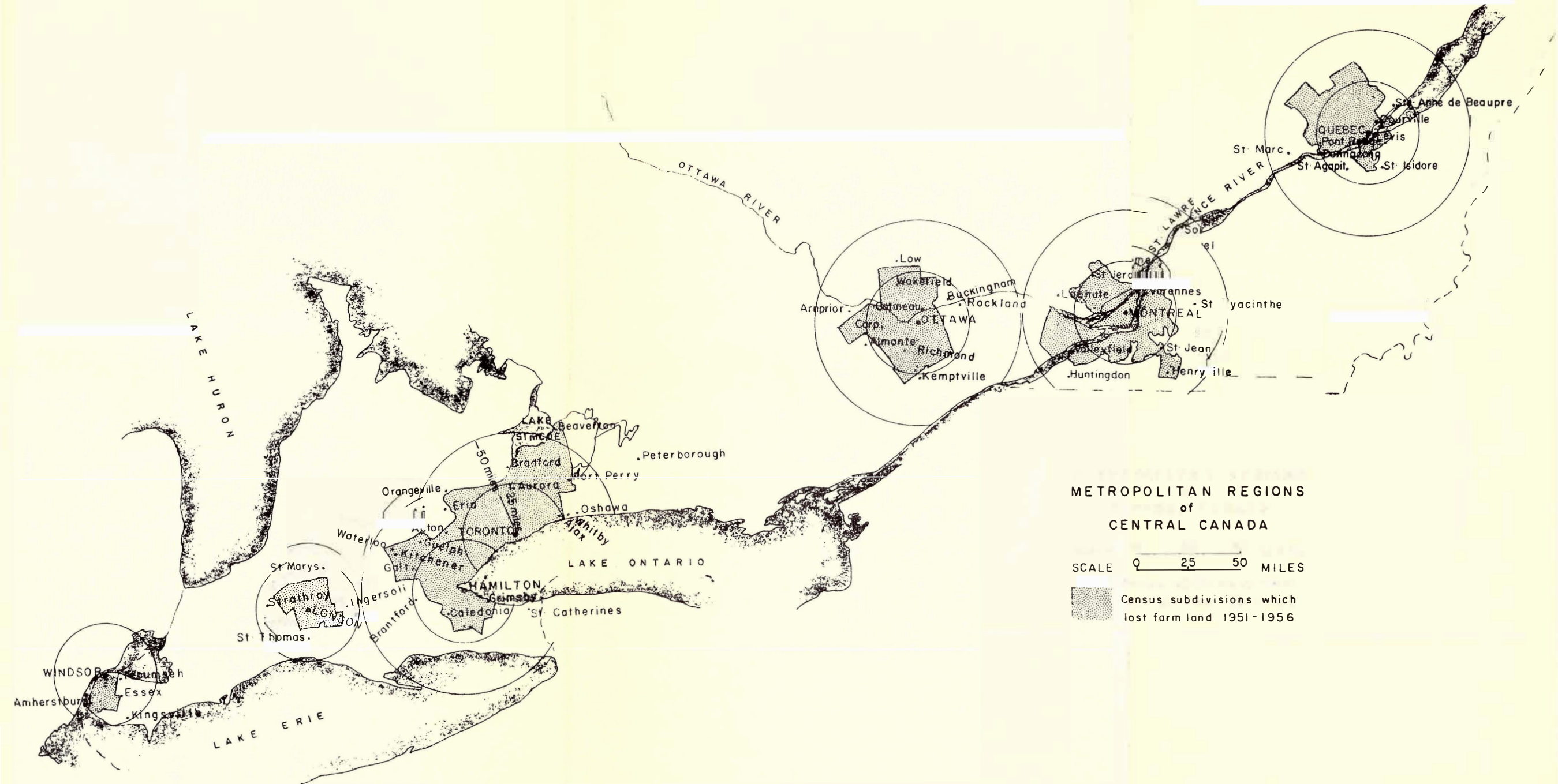
The CHAIRMAN: Senator Smith, did you have your question answered?

Senator SMITH (*Kamloops*): Yes, thank you.

The CHAIRMAN: If there are no further questions we will adjourn.

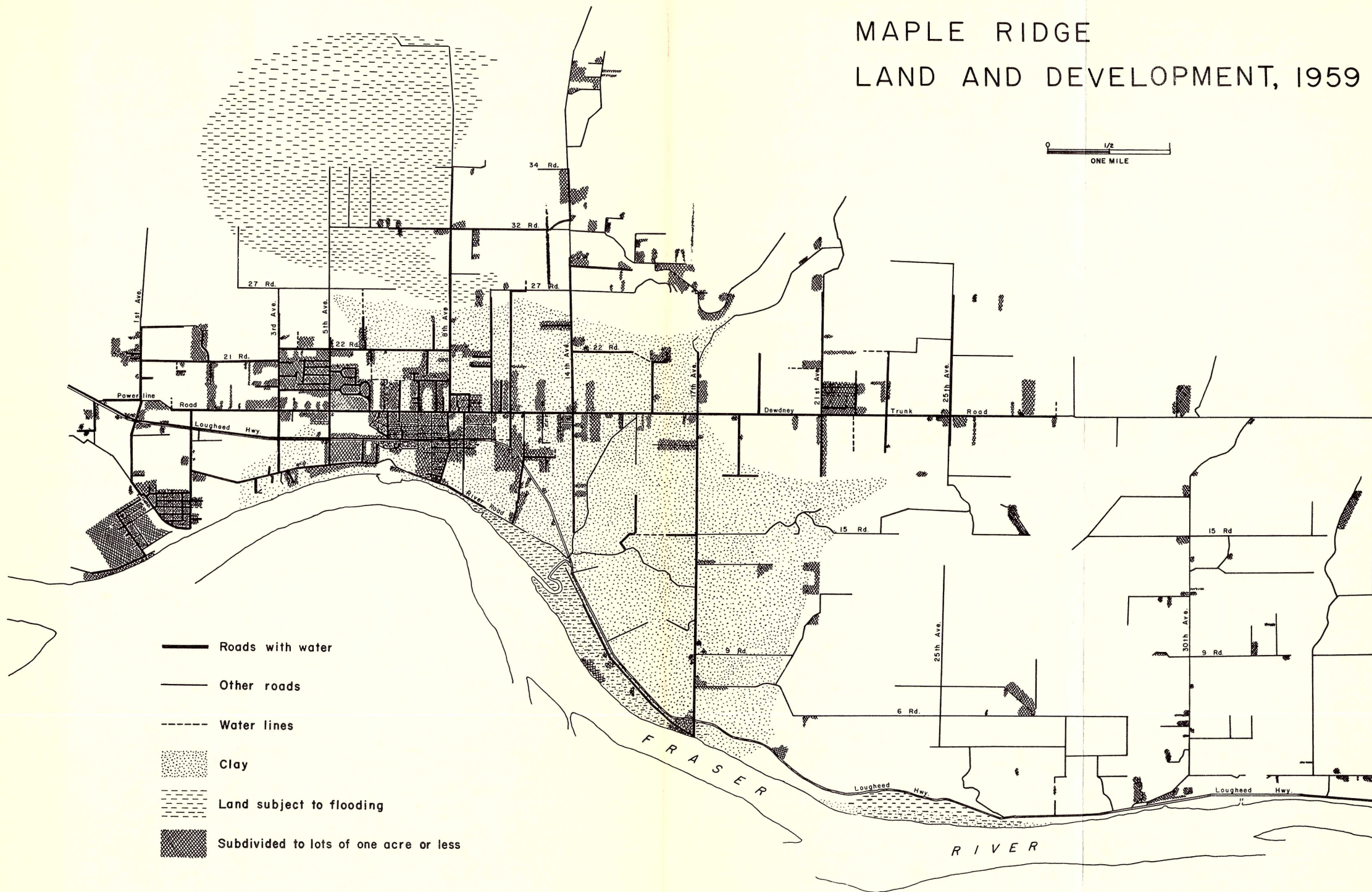
Senator TAYLOR (*Westmorland*): Mr. Chairmain, before we adjourn I am very happy to move a vote of thanks to both Dr. Ripley and Dr. Stobbe for their valuable briefs.

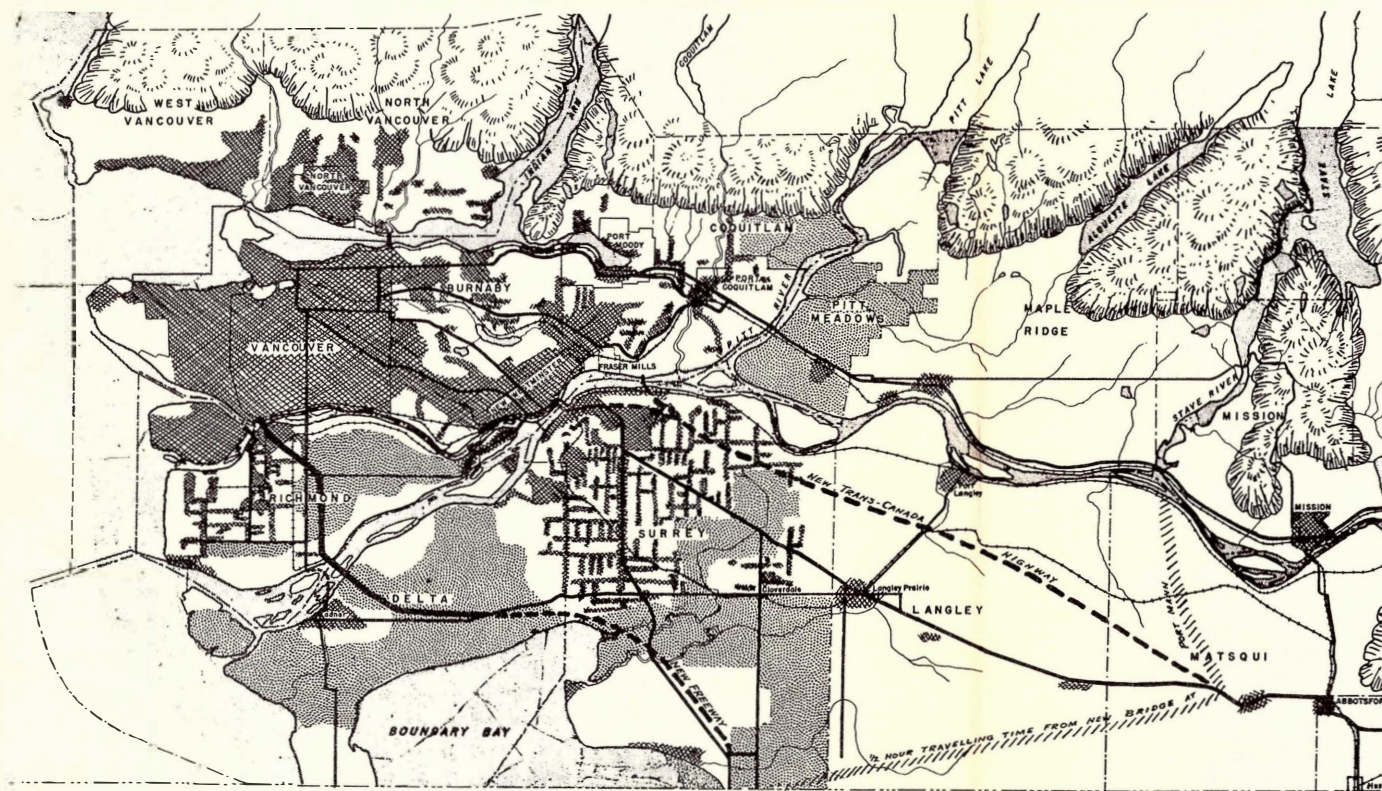
The committee adjourned.





MAPLE RIDGE LAND AND DEVELOPMENT, 1959

0 1/2
ONE MILE





**METROPOLITAN AREA
LOWER MAINLAND REGION
OF BRITISH COLUMBIA**

 - Agricultural Zoning - 5 ac. min
 - Present Urban Development

0 1 2 3 4 5
SCALE IN MILES

MAP 3

HERE IS THE STORY:

This is part of North Delta - about one square mile.

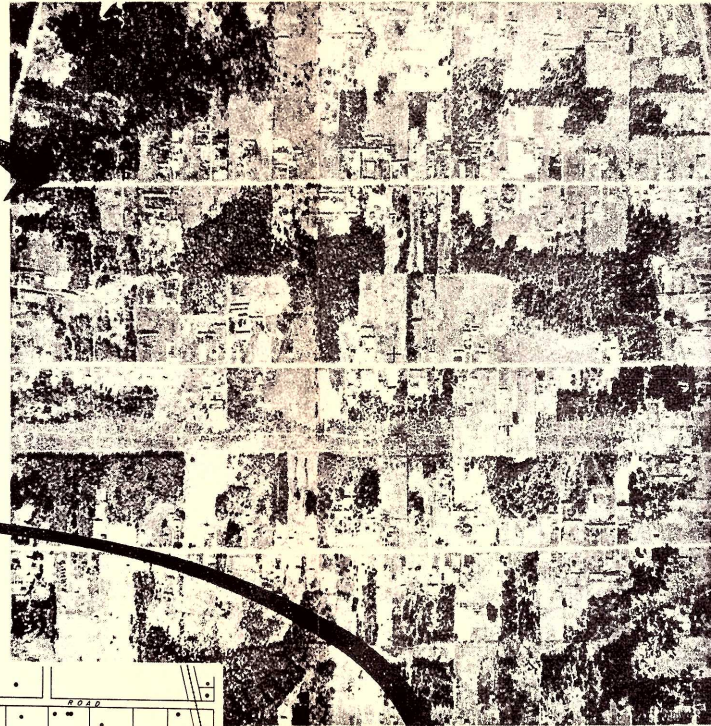
It contains -

- 223 houses
- 3 schools
- a small shopping centre
- a few small stores
- one park site - undeveloped
- a church
- a number of smallholdings

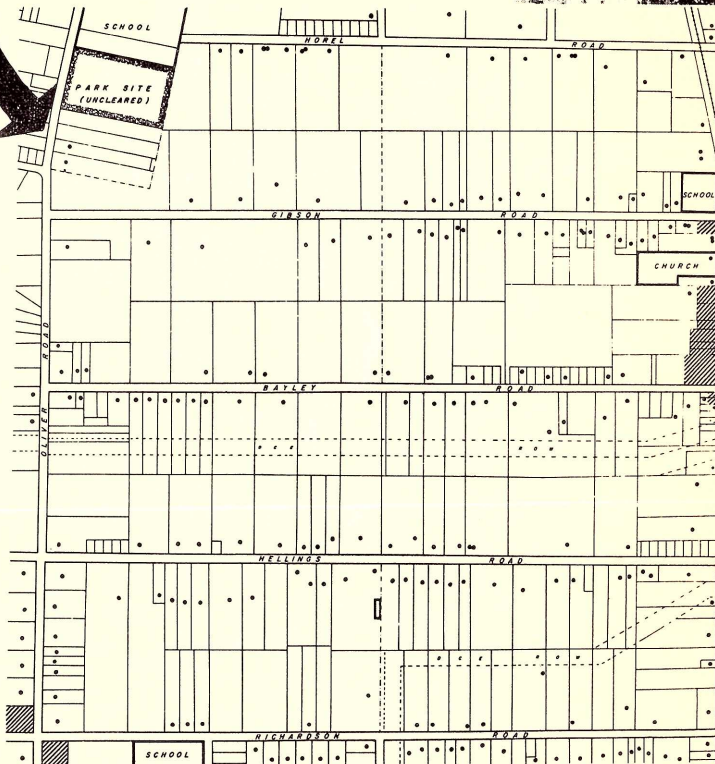
There are about seven miles of road.

About half the total area is unused.

What does it cost the taxpayer ?



Aero Surveys Ltd.



HERE IS PART OF THE BILL:

Laying sewers:	\$ 220,000
Laying watermains:	\$ 89,000
Paving streets:	\$ 44,000
Total:	\$ 353,000
Cost per house.	\$ 1,660

In an area developed at urban density, the cost per house would be about: \$ 400

1959 MEDIAN ASSESSED LAND VALUE (DOLLARS PER ACRE)

